4 May 2003

Estimating Benefits to Improvements in Inland Navigation Projects.

The Corps of Engineers has developed a network of projects that facilitate movement of traffic. Fleets of barges pushed by towboats form tows with various types of barges, which contain up to 1500 tons of dry or liquid commodities. Each project is designed to move expected commodities in fleet configurations that are efficient. Private carriers supply towboats and barges and are now paying for 50% of new project costs via a 20 cents per gallon fuel tax; docks and ports may be private or public. The Corps projects are combinations of locks and dams along with channel configurations to facilitate safe transit of tows or other vessels which are expected to transit the system. Constraints imposed by lock and channel dimensions along with projected traffic levels establish the without conditions for benefit assessment.

The analysis of the economic benefits of waterway improvements is based on a set of movements from origin to destination by water or alternative modes:

Inland origin to river dock to destination dock to inland destination.

At each transfer point, costs of trans-loading accrue. Thus for each movement, the complete transit costs by water or alternative mode is compared. The difference between waterway costs and alternative mode costs become the basic benefit. For existing waterways an improvement produces an increment of benefits that are compared to the cost of the improvement to produce the benefit-cost ratio.

Future growth in traffic must be forecast. The inland waterway system experienced steady growth of 3-4 per cent per year from the 1950's to about 1980. Since 1980 growth has been erratic in various parts of the system, partly due to deregulation of rail and truck rates, the impact of air quality regulations on coal sources, erratic changes in export markets for grain and coal and imposition of barge fuel taxes. Projections of future traffic have become much more difficult.

Since the inland waterway system is a network, system models must estimate the impact of traffic delays on barge costs. The Corps developed efficient models to estimate these costs during the 1980 period. They are founded on queuing models along with many other features to facilitate tracking cost changes in various parts of the system and estimating the present worth of beneficial improvements.

If the origin-destination each movement does not remains constant through the period of analysis the basic data set must be adjusted to reflect the change. The mew combination of origin-destination becomes an additional movement, and the analysis becomes more complex.

My suggestions for improved analysis.

The existing fuss between models used by the Corps should end. Both the Upper Miss and Ohio River models produce similar estimates of benefits if the same data are inputs. Differences reflect assumptions about data.

Simulation of delays is much more credible than queuing models. The assumption that the mean and standard deviation of delay data is not founded in the data that I have examined.

Waterway movement data is over aggregated in the models used by the Corps. The basic Waterway shipment data collected by WCSC is dock to dock. Most system models aggregate the data to Lock pool to Lock pool.

In addition, the trip from actual inland origin to the dock for loading on barges and from the destination dock to the actual destination may not be collected. This biases the estimate of waterway costs and the selections of origin and destination of the alternative mode. This problem can be resolved economically with a statistical sampling program.

Between over aggregation and lack of inland legs of each waterway movement the data which would reveal the true waterway demand elasticity is concealed, thus leaving the issue to much less appropriate data sources.

George Antle Ph.D.
540 582-7944
antleg@erols.com